ANATOMY,

DESCRIPTIVE AND SURGICAL.

BY

HENRY GRAY, F.R.S.,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS; LECTURER ON ANATOMY AT ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.

EDITED BY

T. PICKERING PICK, F.R.C.S.,

CONSULTING SURGEON TO ST. GEORGE'S HOSPITAL AND TO THE VICTORIA HOSPITAL FOR CHILDREN; H.M. INSPECTOR OF ANATOMY IN ENGLAND AND WALES,

AND

ROBERT HOWDEN, M.A., M.B., C.M.,

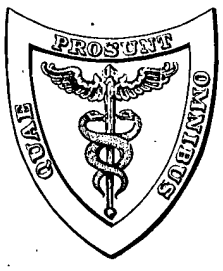
PROFESSOR OF ANATOMY IN THE UNIVERSITY OF DURHAM; EXAMINER IN ANATOMY IN THE UNIVERSITIES OF DURHAM AND EDINBURGH, AND TO THE BOARD OF EDUCATION, SOUTH KENSINGTON.

with a new Introduction by
JOHN A. CROCCO, M.D.

CHIEF OF PULMONARY SERVICES, ST. VINCENT'S HOSPITAL AND MEDICAL CENTER OF NEW YORK, AND ASSISTANT PROFESSOR OF CLINICAL MEDICINE, NEW YORK UNIVERSITY SCHOOL OF MEDICINE

A REVISED AMERICAN, FROM THE FIFTEENTH ENGLISH, EDITION.

WITH 780 ILLUSTRATIONS, MANY OF WHICH ARE NEW.



BOUNTY BOOKS • NEW YORK

This edition is published by Bounty Books,
distributed by Crown Publishers, Inc.

Manufactured in the United States of America

Library of Congress Catalog Card Number : 76-52804

ISBN : 0-517-223651

u t s

of the phosphate with the carbonate of calcium, with traces of fluoride of calcium, phosphate of magnesia, and other salts.

The **cortical substance**, or **cementum** (*crusta petrosa*), is disposed as a thin layer on the roots of the teeth, from the termination of the enamel as far as the apex of the root, where it is usually very thick. In structure and chemical composition it resembles bone. It contains, sparingly, the lacunæ and canaliculi which characterize true bone; the lacunæ placed near the surface have the canaliculi radiating from the side of the lacunæ toward the periodontal membrane, *dental periosteum*, and those more deeply placed join with adjacent dentinal tubuli. In the thicker portions of the crusta petrosa the lamellæ and Haversian canals peculiar to bone are also occasionally found.

As age advances the cement increases in thickness, and gives rise to those bony growths, or exostoses, so common in the teeth of the aged; the pulp-cavity becomes also partially filled up by a hard substance intermediate in structure between dentine and bone (*osteo-dentine*, Owen; *secondary dentine*, Tomes). It is formed by the odontoblasts, the dental pulp lessening in volume.

Development of the Teeth.

The teeth are an evolution from the dermoid system, and not of the bony skeleton: they are developed from two of the blastodermic layers, the epiblast and mesoblast. From the former the enamel is developed, from the latter the dental pulp, dentine, cementum, and pericementum. It is customary to view the development of the permanent and temporary teeth as separate studies.

The earliest evidence of tooth-formation in the human embryo is observed in about the seventh week. The mucous membrane covering the embryonic jaws is seen to rise as a longitudinal ridge along the summit of each jaw.[1] A transverse section through the jaws will show the elevation to be due to a linear and outlined activity of the germinal epithelial layer: a corresponding epithelial growth is seen to sink as a band into the mesoblastic tissue beneath. The local cell-activity continues, and in its descent the band appears to meet with a resistance which causes a flattening of its extremity into a continuous lamina. From the inner (toward the tongue) edge of the lamina epithelial cords are given off, ten in number, one for each temporary tooth.

The growth of each cord continues, and each expands into a flask-like form, the walls covered by a layer of germinal cells, its interior by swollen mature cells. The ingrowing bulb is now seen to flatten upon its lower surface, as though it had met with an outlined resistance from the mesoblastic tissue beneath. The epithelial ingrowth assumes the general form of the several teeth; it is the enamel-organ of the tooth (Fig. 478). At this period the mesoblastic tissue around each enamel-organ is seen to become differentiated into fibrous tissue surrounding the enamel-organs, but at some distance from them. Islets of bone are also seen to be forming the beginning of the bony maxillæ.

The indentation of the base of the enamel-organ continues until it assumes the form of the future teeth. The cells bounding the organ assume a cylindrical form; the cells of the interior become much expanded, irregular in size and form.

The mesoblastic tissue underlying the enamel-organ is much condensed; evidences of cellular differentiation and a vascular system appear. Bone continues to develop until all of the tooth-follicles are embraced in a gutter of bone. From the lingual side of the cords of the temporary teeth epithelial buds are given off, which sink into the mesoblastic tissue and form the enamel-organs of the permanent teeth. The condensation of fibrous tissue continues until each embryonic tooth is enveloped in a sac, the dental sac; this, together with all of its contents, is called the dental follicle.

The cells of the enamel-organ now undergo a series of differentiations: the inner layer is arranged as columnar epithelium, and is called the ameloblastic or

[1] The maxillary rampart of Kolliker Waldeyer.

This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☑ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☑ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.